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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,107	06/20/2003	Prathyusha K. Salla	132535	7816

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EXAMINER

AZARIAN, SEYED H

ART UNIT	PAPER NUMBER
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2624

DATE MAILED: 11/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/600,107

Applicant(s)

SALLA ET AL.

Examiner

Seyed Azarian

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 15-17 and 19-25 is/are rejected.
- 7) ☒ Claim(s) 4-14 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/20/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1-3, 15-17 and 19-25, are rejected under 35 U.S.C. 102(e) as being anticipated by Yavuz et al (U.S. patent 6,539,074).

Regarding claim 1, Schofield discloses a method for retrospective internal gating comprising (column 8, lines 31-45, retrospective gating);

acquiring images at multiple z-locations z_1, \dots, z_n and at different times t_1, \dots, t_n at each of the z-locations (column 9, lines 13-17 data values for the same axial position Z_0 , also column 16, lines 22-41, the gantry rotation period T , is less than the nominal period of the cardiac cycle);

and reordering the images at least one of the z-locations to obtain a synchronized image set (Fig. 15 column 16, lines 58-67, reconciliation (synchronized) of the selected projection view sets).

Regarding claim 2, Schofield discloses a method in accordance with claim 1 further comprising: extracting motion information from the images by using temporal data acquired at different times t_1, \dots, t_n at each of the z-locations (Fig 11A-11C , also

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column 15, line 50 through column 16, line 8, refer to different trigger delays can be used to generate a four-dimensional model of the heart).

Regarding claim 3, Schofield discloses a method in accordance with claim 2 wherein reordering comprises cyclically reordering the images at each of the z-locations by synchronizing the motion information to have a common starting point (column 15, line 50 through column 16, line 8, refer to different trigger delays can be used to generate a four-dimensional model of the heart, also Fig. 15 column 16, lines 58-67, reconciliation (synchronized) of the selected projection view sets).

Regarding claim 15, Schofield discloses a method in accordance with claim 1 wherein acquiring includes acquiring the images for a respiratory cycle of an object and at least one of a two-third and a complete gantry rotation (Fig. 1, column 4, line 63 through column 5, line 18, multiple cardiac cycles also refer to rotation of the gantry).

Regarding claim 16, Schofield discloses a method in accordance with claim 1 further comprising: designating one of the images in a temporal sequence t_1, \dots, t_n at one of the z-locations as a reference image (column 9, lines 13-17 data values for the same axial position Z_0 , also column 16, lines 22-41, the gantry rotation period T , is less than the nominal period of the cardiac cycle);

determining a closest image in which motion of an organ is minimal with respect to a position of the organ in the reference image, the closest image being an image in the temporal sequence t_1, \dots, t_n at a z-location adjacent the z-location of the reference image (see claim 1, also column 14, lines 31-54, refer to reference).

Regarding claim 19, Schofield discloses a method in accordance with claim 1 wherein reordering comprises cyclically reordering a four-dimensional (4D) set of the images based on at least one of 1-dimensional (1D) motion information of an organ that is imaged and 2-dimensional (2D) image information of the images (see abstract image generation from four-dimensional projection data of an imaged object, also claim 1);

the cyclical reordering based on the 1D motion information providing a 1.^{sup}st set of reordered images and the cyclical reordering based on the 2-D information providing a 2.^{sup}nd set of reordered images (column 8, line 61 through column 9, line 18, the two dimensional and one dimensions of the sonogram corresponds to angular position of the fan beam).

Regarding claim 20, Schofield discloses a method in accordance with claim 19 further comprising comparing the order of the first and second sets of reordered images to determine whether there is match between the orders of the first and the second sets (Fig. 15 column 16, lines 58-67, reconciliation (synchronized) of the selected projection view sets).

Regarding claim 21, Schofield discloses a method in accordance with claim 1 wherein acquiring the images includes acquiring the images for one breath cycle of an object plus at least one of 0.33 seconds and 0.5 seconds (column 9, lines 48-64, .5 second).

Regarding claim 22, Schofield discloses a computer-readable medium encoded with a program configured to, acquire images at multiple z-locations $z_1 \dots z_n$ and at different times $t_1 \dots t_n$ at each of the z-locations; and reorder the images at at least one

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of the z-locations to obtain a synchronized image set (see claim 1, also column 18, lines 56-67, computer-readable medium encoded with a program for performing tomographic image generation).

Regarding claim 24, Schofield discloses an imaging system comprising, a scanner configured to generate attenuation data by scanning an object; and a controller electrically coupled to the scanner, the controller configured to: acquire images at multiple z-locations $z_1 \dots z_n$ and at different times $t_1 \dots t_n$ at each of the z-locations, and reorder the images at least one of the z-locations to obtain a synchronized image set (column 1, lines 3-53, Fig. 1, ct scanner and item 130, a controls section).

Regarding claim 25, Schofield discloses a computed tomography (CT) imaging system comprising: a radiation source; a radiation detector; and a computer electrically coupled to the source and the detector, the computer configured to: acquire CT images at multiple z-locations $z_1 \dots z_n$ and at different times $t_1 \dots t_n$ at each of the z-locations; and reorder the CT images at least one of the z-locations to obtain a synchronized image set (see claims 1 and 24, also column 5, lines 3-24, beam of radiation).

With regard to claims 17, 23 the arguments analogous to those presented above for claims 1, 16, 22 are respectively applicable to claims 17, 23.

Allowable Subject Matter

3. Claims 4-14 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowable subject matter.

With respect to claim 4, closest prior art of Yavuz does not disclose or suggest, among other things, "dividing the mean intensity image into a matrix of blocks of a desired size of region of interest (ROI), generating a binary image to distinguish organs that are imaged from a background of the binary image, wherein the organs include internal organs and an outer abdominal wall and measuring mean intensity values at times t_1 t_n for each of the selected ROI blocks, the mean intensity values measured from temporal data acquired at different times t_1 t_n at the z-location at which the mean intensity image is computed; and plotting the mean intensity values as a function of times". Additionally with respect to claim 18, the closest prior art of Yavuz does not disclose or suggest, among other things, "identifying the organ boundary in the reference images and images at the z-location of the closest image, the images at the z-location of the closest image including the closest image, extracting normal flow vectors from the organ boundary in the reference image and the images at the z-location of the closest image, fitting the normal flow vectors within an affine motion model that outputs a measure of a motion of the organ and comparing motions of the organ in the images at the z-location of the closest image with the motion of the organ in the reference image".

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These key features in combination with the other features of the claimed invention are neither taught nor suggested by the art of record.

Other prior art cited

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(U.S. patent 6,556,695) to Packer et al is cited for method for producing high-resolution real-time images of structures and function during medical procedures.

(U.S. patent 6,298,260) to is cited for respiration responsive gating means and apparatus and method using the same.

(U.S. patent 6,144,874) to is cited for respiratory gating method for MR imaging.

(U.S. patent 5,871,019) to Belohlavek is cited for fast cardiac boundary imaging.

(U.S. patent 6,501,981) to Schweikard et al is cited for apparatus and method for compensating for respiratory and patient motions during treatment.

Contact Information

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Azarian whose telephone number is (571) 272-7443. The examiner can normally be reached on Monday through Thursday from 6:00 a.m. to 7:30 p.m.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached at (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.

Status information about the PAIR system, see [http:// pair-direct.uspto.gov](http://pair-direct.uspto.gov). Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Seyed Azarian
Patent Examiner
Group Art Unit 2624
October 29, 2006

A handwritten signature in cursive script, reading "Seyed Azarian".